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ABSTRACT

This study of second language learning investigated the effects of a written reading comprehension exercise and an oral discussion activity as alternative tasks mediating between a written text and learners' summaries of the text. Subjects were 80 University of Hong Kong freshmen, randomly assigned to three groups. Each group was provided a reading text and asked to write a summary of it, including an evaluation of two main points. Two of the groups were also asked to perform a mediating task (one group an oral task and one group a written task) before writing the summary. Summaries were graded by six native speakers of English for grammar, spelling, and vocabulary usage. Evaluators looked for indications of dependency on the text, including exact and near copies of text and paraphrasing. Results show the overall, control group (no mediating task) achieved higher scores on the summaries than the written mediating task group, which in turn scored higher than the oral mediating task group. The control group also appears to have depended more on the original text in writing a summary; none relied heavily on paraphrasing, and the oral mediating task group was the most able to put ideas into its own words. Three appendixes contain the text used in the study, the reading exercise, and "idea units." Contains 19 references. (MSE)

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# PIG IN THE MIDDLE? EFFECTS OF MEDIATING TASKS ON COGNITIVE PROCESSING OF TEXT

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# PIG IN THE MIDDLE? EFFECTS OF MEDIATING TASKS ON COGNITIVE PROCESSING OF TEXT.

*Desmond Allison, Vivien Berry and Jo Lewkowicz*

## Introduction

The notion that exercises or activities may mediate between a text and student readers[1] appears to need little comment in itself, as this is clearly what they are designed to do in order to assist understanding. The exact nature and impact of such mediation, however, is more controversial, and raises questions over the most appropriate uses of class time and the proper roles of teachers and learners. A thorough examination of these concerns calls for a combination of reflection on experience and empirical investigation across a range of learners, activities and texts. The authors view these approaches to research not as mutually exclusive or opposed, but as complementary and indeed symbiotic.

This paper reports on a study of the effects of a written reading comprehension exercise and an oral discussion activity as alternative tasks mediating between a written text and learners' summaries of that text. Summary writing was considered to be a relevant activity for the learners in the study, who were first-year undergraduate students of economics. Summary writing, a task required by subject lecturers, calls upon abilities to comprehend texts, extract essential information and ideas, and write clearly and accurately (all points made by economics staff in discussions when the English course for first-year students was being designed). In a language class, oral or written summaries can also help teachers discern problem areas in students' comprehension (Carrell and Eisterhold 1988:88).

The study compares the two mediating tasks with each other and with a third condition in which the summaries were written with no mediating task. It must also be pointed out that summary writing may itself influence the interaction between text and readers, and that a summary is not a direct embodiment of a learner's interpretation of the text. In presenting and discussing the study's empirical findings, the authors do not pretend to resolve or even treat all the complex evaluative issues that arise. We do, however, seek to set some limits on speculative enquiry by relating possibilities to observed outcomes.

Stubbs (1987:27) points to the hidden curriculum that is constructed and enacted through choices of classroom activity, and affirms that "students' interpretations of texts can be widely different under different classroom practices." A reason for concern over such induced readings is that widely differing interpretations of texts can all be valid (Alderson and Urquhart 1984:47). An acceptance of plurality, and a corresponding rejection of any belief in one sole correct interpretation (the teacher's) of what a text can mean, do not of course imply that all interpretations are automatically valid or equal in worth, nor need these insights invalidate classroom practices that are aimed at developing learners' comprehension. Even so,

the recognition that classroom practices will also lead to different readings of texts poses a challenge to the teacher. When are we leading learners towards a better understanding of a text, and towards more effective strategies for coming to grips with other texts, and when are we prescriptively or unwittingly placing obstacles in the path of learners as they seek to come to terms with texts in their own diverse ways? When one also considers the complex relationship between understanding a particular text and integrating one's reading within personal content schemata in some domain of experience or study, the role of comprehension exercises or activities in the language class is no longer something that we can afford to take for granted.[2]

Learners' interpretations of texts are not directly accessible, but have to be inferred from other evidence. Many integrated tasks in language classes culminate in sustained language production by learners, and the resulting products offer indirect but important testimony for an account of how texts have been interpreted. With tertiary students this evidence might take the form of a written report, summary or essay, a spoken presentation on the topic, or a seminar-style discussion of issues raised in a text. Our focus here will be on final written outcomes.

Working with secondary school teachers as advanced learners in Hong Kong, and concentrating on how these learners reacted to different forms of reading comprehension exercises, Allison (1989) found that reading exercises that had been specifically designed for particular texts were substantially better received than were standard reading exercises of the kinds promulgated by Scott et al. (1984), Edge (1985) and Walker (1987). Allison recommended that further research could more usefully compare text-specific reading exercises with other activities, especially discussion of the text, in order to determine the nature and effects of these different mediation processes. In a first language context, research into the psychological processes involved in student writing already suggests that, under certain conditions, students' writing will be qualitatively different depending on whether the stages gone through before reaching the final written draft involve oral or written processes (Jenson and DiTiberio 1984).

**Aims and Objectives of the Research**

In the light of the above interests and concerns, a study was undertaken with first-year undergraduate students at the University of Hong Kong, the purpose of which was to determine how, and to what extent, students' written summaries of a text would differ under three different conditions. These comprised an oral mediating task (small group discussions), a written mediating task (completion of tailor-made reading comprehension exercises), and no mediating task (control group) between reading text and written summary.

Specific attention was paid to the following parameters:

- impression grades given by two independent raters (teachers not familiar with the research design);

- length and summary in terms of number of words;

- number of t-units (a t-unit being a main clause with any subordinate clauses: Hunt 1965);

- number of error-free t-units;

- categorisation of t-units (and also of error-free t-units) in terms of text dependence/ independence;

- inclusion of idea units 'targeted' by the researchers as relevant and reasonably likely to occur in a summary of the selected text.

**Method**

The 80 students in the study were pseudo-randomly assigned to one of three treatments[3]:

1. Group 1 (N = 28): reading text + oral-mediating task + written summary

2. Group 2 (N = 26): reading text + written mediating task + written summary

3. Group 3 (N = 26): reading text + no mediating task + written summary (control group)

Comparison of the students' H.K.E.A. Use of English examination results, which afforded a recent and readily available independent measure of English language proficiency, revealed no significant differences between the groups. This suggests that between-group comparisons can reasonably be associated with the independent variable in our study rather than any accidental anomaly in the composition of the groups.

Each treatment group was given the same reading text, entitled "Is there a gene for genius?" (McCrone 1993). The text (See Appendix 1) of 1736 words, with a FOG index of 14.29 (Gunning 1952, Davies and Irvine 1993) was considered to be of appropriate reading difficulty level for the target population. The topic was judged to be of likely interest to these students, some of whose first-year courses were taken in common with students reading for a degree in Social Sciences. The article was taken from a quality newspaper. While this means that the text has elements of journalistic style rather than an academic textbook style, it clearly fell

within the kind of reading material prescribed or encouraged in undergraduate degree curricula.

After reading the text, students in Group 1 discussed the text in small groups before writing their summaries (the discussions were recorded and will be analyzed at a later stage); students assigned to Group 2 completed a series of tailor-made reading comprehension exercises before writing (see Appendix 2 for details of this task); students in Group 3, the control group, were simply asked to read the text and summarize it in writing. All three groups were given a double class to complete the set activities. This was judged appropriate on the basis of a pilot study conducted on a comparable group of students. For groups 1 and 2 the time was divided into 20 minutes of reading time, 20 minutes on the mediating task and 40 minutes for writing the summary. Group 3 students were given the full 80 minutes to use as they considered most appropriate. The final task read as follows:

> On the paper provided,
>
> - summarize the article
> - evaluate the two main viewpoints developed in the article
>
> You may use the text and your notes (if any) to help you complete this task.

The last comment only was varied for Group 2 in light of their task, and read:

> You may use the text and the reading questions to help you complete this task.

Both the text and any other written materials were therefore retained while students wrote their summaries.

Each written summary was independently graded by two markers (in addition to the researchers) across the three conditions. In all there were six independent markers, all native speakers of English; three were male and three were female. Each marker graded 26 or 27 scripts; each script was marked twice by one male and one female marker; scripts were pseudo-randomly distributed to markers so each set of scripts represented all three conditions. The scripts were graded holistically on a 9-point scale using course grading guidelines that were familiar to all the markers. The scripts were also scored by the researchers on a number of quantitative and qualitative measures that could provide other bases for comparison across the groups. Word counts used the operational definition of "words" that derived from the insertion of spaces between visible "words" in the written texts (which were typed up for later ease of reference). Division of each text into t-units and subsequent identification of "correct" t-units in terms of standard grammar,

spelling and vocabulary usage were tasks independently undertaken by each researcher. Any initial discrepancies in analysis were carefully resolved thorough discussion. The main aim here was to ensure consistency of judgement, so that meaningful comparisons could be made across the groups.[6]

Perhaps more controversially, but within the same operational spirit and context, each t-unit was also placed in one of four categories to denote the degree and kind of text dependence or independence that it exhibited. This approach owes much to Campbell (1990), but the categorisation was adapted for our work, not least as a summary writing task constrains what is to be expected. Direct attributed citation (which proved to be extremely rare) was included along with other "exact copies". In cases where the summary text differed from the source text, the concern was to describe the degrees of difference, for example in the extent of grammatical reconstruction or lexical substitution involved when "chunks" of source text appeared to have been adapted or combined. Any imposition of categories on such complex and graduated forms of differentiation will inevitably set up "boundary problems" for the analysts. We accepted these intellectual and procedural constraints in the interests of obtaining comparable data over a relatively large number of scripts, while naturally recognising that the richness of each individual script cannot be wholly captured in such descriptions. (We see in-depth analysis of individual scripts, protocol analysis and interview data as valuable research techniques that can complement the comparisons across groups featured in the present study.) This approach gave us the following categories:

decreasing in text dependency ↓

- exact copy = copied word for word correctly from the text
- near copy = small elements of the text added or otherwise exact copies; blend of extensive exact copying plus minor elements of paraphrase
- paraphrase = substantial syntactic reworking; bringing textual elements together
- own words = bringing ideas together or adding to the text.

The last three categories were identified in terms of the dominance of almost exact copying of source text, extensive grammatical reworking or recombination that still remained close to identified chunks of source text, or extensive departure from wordings in the source text. An example of each category (with intervening t-unit boundaries shown by the symbol //) is given below:

Exact copy: The discovery of a first gene does not mean that the riddle of intelligence has been solved (script 70:8)

Near copy: However, the children who fared best were those parents were both supportive and stimulating (script 55:18)

Paraphrase: According to the result of Dr. Robert Plomin's experiments, an unnamed gene which plays a part in determining intelligence has been identified by using new gene mapping techniques (script 37:4)

Own wording: Remember we have fertilizer in the world, // although the soil is not rich, fertilizer can improve it. // Parental influence is somewhat a kind of fertilizer for the growing up of a genius. (script 21:12,13,14)

The final measure for this study was the occurrence of identified "idea units" in summaries of the text (Appendix 3). It would have been unrealistic and excessively prescriptive to seek to list all and only those propositions that would occur in some ideal summary, and no such ambition informed our work. Our aim, rather, was to list selected units that the researchers considered to be relevant and reasonably likely to occur in summaries of this text. Our basis for such an analysis was:

1. independent listing of units by each researcher;

2. comparison with a summary written by a teacher;

3. several readings of the students' summaries (without specifically targeting this issue). The distribution of these "targeted" idea units could then be traced across the summaries written under the three task conditions.

The number of targeted points was compared across conditions. Any notable differences found across the conditions must remain open to qualitative interpretation. Further study of individual "idea units" will be undertaken in a later research report.

Evaluative interpretation of this sort of data is, of course, essential. While it is true that the identification of "idea units" in differently worded summaries already involves a degree of interpretation - and of intersubjective verification - this interpretative process must be sharply distinguished from any value judgements that might be made about the scope or effectiveness of different summaries. In particular, "successful" summaries could be written at various levels of detail, so that no simple relation between occurrence of points and quality of summary should be assumed.

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**Results and Discussion**

Table 1 presents summary statistics for scores awarded in each condition. The results show that the control group (group 3: no intervening task) achieved higher average scores than group 2 (written mediating task). Group 2 in turn scored higher on average than group 1 (oral mediating task).

**Table 1a**

**Mean Scores for Markers Across Three Conditions**

| Group | Count | Mean (max=18) | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 6.107 | 2.699 | 2.628 | .079 |
| Grp 2 | 26 | 3.470 | 3.470 | | |
| Grp 3 | 26 | 3.091 | 3.091 | | |
| Total | 80 | 3.156 | 3.156 | | |

**Table 1b**

**Mean Scores for Markers + Researchers Across Three Conditions**

| Group | Count | Mean (max=27) | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 10.286 | 4.162 | 1.573 | .214 |
| Grp 2 | 26 | 11.192 | 4.561 | | |
| Grp 3 | 26 | 12.308 | 3.813 | | |
| Total | 80 | 11.2375 | 4.219 | | |

Analysis of variance (one-way Anova, SPSS for Windows: Norusis 1992) in Table 1a indicates that the difference in mean scores is not significant at the <.05 level. The observed tendency towards difference ($p = .079$) should not, however, be automatically dismissed. Further research with a larger sample size is needed to pursue this already noteworthy trend.

Observed differences are smaller when the researchers' marks are added to those of the markers (Table 1b). It is likely that the researchers had different expectations from the other markers. They were, after all, more familiar with the task and may have been more tolerant of original wording and explanation - a point taken up in the "Implications" section.

**Table 2**

**Mean Number of Words Across Three Conditions**

| Group | Count | Mean (rounded) | SD (rounded) | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 309 | 54 | 6.676 | .002 |
| Grp 2 | 26 | 326 | 86 | | |
| Grp 3 | 26 | 384 | 91 | | |
| Total | 80 | 339 | 84 | | |

The mean number of words was calculated and compared across the three groups using Anova (Table 2), and here a highly significant difference (p=.002) was found. *Post hoc* analysis (Scheffé test) shows the significant differences are between groups 1 and 3 and groups 2 and 3.

**Table 3a**

**Mean Total T-units Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 19.964 | 4.023 | 2.474 | .091 |
| Grp 2 | 26 | 20.539 | 5.338 | | |
| Grp 3 | 26 | 23.115 | 6.861 | | |
| Total | 80 | 21.175 | 5.598 | | |

Scheffé test with significance level <.05= No two groups are significantly different

**Table 3b**

**Mean Correct T-units Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 8.964 | 3.271 | 1.268 | .287 |
| Grp 2 | 26 | 8.000 | 4.775 | | |
| Grp 3 | 26 | 10.231 | 6.689 | | |
| Total | 80 | 9.063 | 5.085 | | |

Scheffé test with significance level <.05= No two groups are significantly different

**Table 3c**

**Mean Incorrect T-units Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 11.000 | 4.009 | 1.121 | .331 |
| Grp 2 | 26 | 12.539 | 4.769 | | |
| Grp 3 | 26 | 12.885 | 5.942 | | |
| Total | 80 | 12.113 | 4.956 | | |

Scheffé test with significance level <.05= No two groups are significantly different

The mean number of t-units per script (Table 3a) did not differ significantly across groups. This suggests that the students in group 3 (control) were using longer t-units: whether this involves additional complexity and if so, how far such complexity may reside in either the clause or the nominal group (cf. Halliday 1985: xxiv) remains to be verified. Separate analyses of correct t-units (Table 3b) and of incorrect t-units (Table 3c) also indicated no significant differences at the <.05 level.

**Table 4**

**Mean Exact Copies Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 1.036 | 1.138 | 3.091 | .051 |
| Grp 2 | 26 | 0.962 | 1.562 | | |
| Grp 3 | 26 | 2.269 | 3.207 | | |
| Total | 80 | 1.413 | 2.197 | | |

Scheffé test with significance level <.05= No two groups are significantly different

All t-units classified as exact copies (EC) were by definition correct. The average number of ECs was noticeably higher for the students in the control group than for the other two groups. The observed differences are very close to significance at the <.05 level (p = .0511), and the likelihood of non-random difference is sufficient to merit further study. It should be noted that students in the control group had longer to familiarise themselves with the text and extract what they considered to be the relevant parts.

**Table 5a**

**Mean Correct Near Copies Across Three Conditions.**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 3.179 | 2.465 | 5.163 | .008 |
| Grp 2 | 26 | 2.769 | 2.372 | | |
| Grp 3 | 26 | 5.423 | 4.438 | | |
| Total | 80 | 3.775 | 3.385 | | |

Scheffé test with significance level <.05= Grps. 1 $ 3*; Grps. 2 & 3*

**Table 5b**

**Mean Incorrect Near Copies Across Three Conditions.**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 2.214 | 1.912 | 15.523 | .0000 |
| Grp 2 | 26 | 3.808 | 3.418 | | |
| Grp 3 | 26 | 6.769 | 3.570 | | |
| Total | 80 | 4.213 | 3.550 | | |

Scheffé test with significance level <.05= Grps. 1 $ 3*; Grps. 2 & 3*

Highly significant differences were found in the mean number of near copies, both for correct near copies (NC: p = .008) and incorrect near copies (NCX: p = .0000), as shown in Tables 5a and 5b.

Taken together, the results for exact copies and near copies indicate that Group 3 students appear to have relied much more heavily on the original text in writing their summaries, and the additional time these students had for writing does not appear to have added to their accuracy. Indeed, the extent to which the different groups relied on the original text was the most noticeable difference in the students' scripts, a point taken up below.

**Table 6a**

**Mean Correct Paraphrases Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | .929 | 1.086 | .000 | 1 |
| Grp 2 | 26 | .923 | 1.093 | | |
| Grp 3 | 26 | .923 | 1.294 | | |
| Total | 80 | .925 | 1.145 | | |

Scheffé test with significance level <.05= No two groups are significantly different

**Table 6b**

**Mean Incorrect Paraphrases Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 1.429 | 1.230 | 3.744 | .038 |
| Grp 2 | 26 | 2.615 | 1.651 | | |
| Grp 3 | 26 | 2.114 | 1.883 | | |
| Total | 80 | 2.038 | 1.657 | | |

Scheffé test with significance level <.05= Groups 1 & 2*

As seen in Table 6, none of the groups appear to have relied heavily on paraphrases. The only significant difference across groups that was discerned at the .05 level was between groups 1 and 2 on incorrect paraphrases. The difference in distribution of text-independent elements is, rather, a consequence of the results for the category of "own wording" (Tables 7a and 7b). The mean numbers of "own wording" t-units in both instances are somewhat higher for group 1 than for group 2 and considerably higher than for group 3. The difference between groups 1 and 3 is significant at the <.05 level in both cases ($p = .016$ and $p = .014$ respectively).

**Table 7a**

**Mean Correct Own Words Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 3.821 | 2.907 | 4.390 | .016 |
| Grp 2 | 26 | 3.270 | 3.617 | | |
| Grp 3 | 26 | 1.615 | 1.551 | | |
| Total | 80 | 2.925 | 2.946 | | |

Scheffé test with significance level <.05= Groups 1 & 3*

**Table 7b**

**Mean Incorrect Own Words Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 1.429 | 7.357 | 4.511 | .014 |
| Grp 2 | 26 | 2.615 | 6.192 | | |
| Grp 3 | 26 | 2.114 | 4.039 | | |
| Total | 80 | 2.038 | 5.900 | | |

Scheffé test with significance level <.05= Groups 1 & 3*

From these results and from the preliminary study of individual scripts, members of group 1 (oral) after discussing the text appear to have been better able to reformulate the ideas put forward in the text into their own words. Not all their attempts at reformulation were successful. A number of the incorrect own word (OW) t-units were incorrect not simply at the grammatical level but at the conceptual level; however, this was true across groups, not only for group 1. For example:

- This gene is called "g" which is IQ tests are supposed to measure. (Group 1: script 7:5)

- ... one of the genes that plays a part in determining intelligence has tracked down. It is believed that people with such genes own more cognitive ability, measured by IQ tests. (Group 2: script 32: 7&8)

**Table 8**

**Text Dependence/Independence Across Three Conditions (Percentages)**

| Group | Text Dependence (%) | | | Text Independence (%) | | |
|---|---|---|---|---|---|---|
| | exact copy | near copy | total | paraphrase | own words | total |
| Grp 1 | 5.19 | 27.01 | 32.20 | 11.91 | 55.99 | 67.80 |
| Grp 2 | 4.68 | 32.02 | 36.70 | 17.23 | 46.07 | 63.30 |
| Grp 3 | 9.80 | 52.66 | 62.46 | 13.12 | 24.44 | 37.56 |

Table 8 summarises results according to degrees of text-dependence. For this purpose, we take exact copies and near copies to be "text-dependent" and paraphrases and "own wording" instances to be "text-independent". Values are also shown separately for our four categories. From these figures, it seems that the absence of an intervening task, associated also with more time for writing, tends to encourage outcomes that are more text-dependent.

**Table 9**

**Mean Ideas Units (Targeted Points) Across Three Conditions**

| Group | Count | Mean | SD | F-ratio | F-prob |
|---|---|---|---|---|---|
| Grp 1 | 28 | 12.393 | 3.985 | 12.832 | .0000 |
| Grp 2 | 26 | 16.115 | 4.894 | | |
| Grp 3 | 26 | 18.039 | 3.550 | | |
| Total | 80 | 15.438 | 4.760 | | |

Scheffé test with significance level <.05= Groups 1 & 2*; 1 & 3*

Results for the incorporation of idea units in summaries (Table 9) show that the number of targeted points occurring in the group 1 scripts (oral task) was found to be significantly lower than in the other two groups. Although it is difficult to determine how many points needed to be targeted for an adequate summary, the findings once more suggest that having discussed the text, the students in group 1 felt somehow less obliged to adhere as closely to the original text as the students in the other two groups.

Appendix 3 gives the list of 44 targeted points. Some points such as 34 and 41 appear to have been targeted by all groups of students. Others, however, were more frequently targeted by one group than another. For example, point 35, referring to the state of mind of the children with both stimulating and supportive parents, was targeted more frequently by group 1 (oral mediating task), the frequency of occurrence being O=13, R=8, C=5. Point 44, on the other hand, concluding that research into better parenting and educational techniques will have more lasting significance, was targeted more frequently by the control group than by either of the other groups, the frequencies being O=6, R=11, C=16. Whether these differences are significant will be investigated in a later phase of the research. Further analysis of the oral discussions and the answers to the reading comprehension questions may throw some light on the points that were selected for inclusion in the summaries. At present we can only speculate that students' comments and responses did have an effect on the summaries they subsequently

wrote. From overall figures, it appears likely that points covered by individuals in group 2 in the reading comprehension questions will sometimes prove to be linked to those raised in their summaries. For example, point 10 which was more frequently targeted by group 2 (the respective frequencies being O=2, R=15, C=6) was the same point raised in question 2(b) which read:

> What new kind of research technique has Plomin's team used?

to which the answer was "new gene mapping techniques".

**Implications**

It is worth reviewing how text-dependence or independence may be evaluated in the context of summary writing. Taylor (1984:696) reports that one of the factors that appears to distinguish professional summary writers from amateurs is the ability of the former "to detach themselves and to comment about the article." This implies that, even in summarisation, text-independence is potentially an asset. Yet teachers often appear to expect summaries to match the original text closely. In this study, for example, there appears to have been a tendency for markers to award higher marks to group 3 (control) students whose summaries were made up, on average, of over 60% more text-dependent t-units (in our terms, either exact or near copies). Subsequent discussion with the markers, and with other teachers who had carried out the activity in their classes, also revealed that these teachers believe that a good summary is one that is based closely on the original. For example, markers reportedly marked down the script (script 21, used above to exemplify "own wording") in which the student tried to compare cultivating genius with cultivating a healthy crop, on the grounds that it did not adequately summarise the passage. Another perspective on this comparison, though, could suggest that it shows evidence of reflective interaction with some of the content of the source text.

A number of teachers queried the value of the evaluative element of the task, with some suggesting that this was not a valid requirement of summary writing. It is tempting to argue that the word "summary" evokes such well established formal schemata in teachers that text-dependent answers converging on a preconceived "correct" rendering of the original content are inevitably favoured. Yet if one considers summary writing in terms of the wider academic context, then evaluating arguments becomes an integral part of summarising: academic essay writing entails the extraction and summary of selected materials from source texts as well as the evaluation of main points put forward in such source material. A possible counter to this view, in the case of work in the language class, is that genuine academic writing requires a stronger knowledge base than students in our study would have possessed in relation to the topic. While there is some truth in this reaction, we would argue that students must frequently operate from a limited knowledge base as they pick up clues or discussion material from texts they read.

As noted earlier, written products offer only indirect evidence of how learners have processed a text, and a written summary is only one form of evidence. Our paper has focused on the effects of different mediating tasks upon text processing as evidenced in final task performance, but we must appreciate that the relationship between mediating and final task will in some measure vary according to the choice of final task itself. Had our study specified the final outcome as a personal response to ideas in the source text, rather than as a summary, it is likely that teacher expectations of student writing would have differed considerably. It is also possible (though less evident) that marker reactions to source text conformity or departures from source would have privileged more text-independent outcomes than was the case in this study.

## Conclusion

The initial results we have reported here already offer important practical implications for the relevance and efficiency of different treatment conditions and procedures. It is apparent that the way tasks are assigned does have an effect on students' final summary writing outcomes. If as teachers we want to encourage students to interact with the text and become less text-dependent in their summary writing, then we should encourage them to discuss the text prior to writing. However, if we want them to adhere closely to the original, then what students appear to need is time to approach the text and summary task in the way they find most suitable for the purpose.

In order to extend and strengthen the findings of the present experiment, additional work will be undertaken to compare individuals' performance on mediating tasks (contributions to oral discussion or responses to the reading exercise) with final summary outcomes. Evidence suggesting miscomprehension will also be investigated under each condition. Further studies would need to look at other students, texts, reading exercises, modes of oral discussion and final task specifications. Particular attention might profitably be given, in our view, to the effects of teacher-led or more fully prompted discussions on student participation and on subsequent summary outcomes.

## Acknowledgements

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## Notes

1. The limitation to written text reflects the immediate concerns of this paper. It is likely that many of the comments will also hold for listening comprehension activities.

2. On schemata, see (e.g.) several chapters in Carrell, Devine and Eskey (1988); another locally accessible source is Littlewood (1989).

3. Each treatment condition comprised two classes of students who had initially been randomly assigned to each class.

4. These judgements about "correctness" admittedly beg theoretical questions about the autonomous or derivative status of learners' own grammars and about standard English itself. This does not overly concern us since (a) judgements about correctness are routinely made by and expected of language teachers, (b) we are not claiming absolute or unique rightness for the levels of grammaticality or acceptability that informed our analyses. We believe that most of our judgements would be uncontentious among teachers (once the principle of making any such judgements is accepted), and affirm that our borderline cases were consistently resolved through the procedures we followed.

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**Appendix 1**

**Text used in the study**

**Is there a gene for genius?**

Dr Howard Gardner of Harvard University believes that geniuses are largely made. He has banned television from his home because he fears it might rot the minds of his family. He makes time everyday to listen to his seven-year-old, Benjamin, play the piano - even if it is no more than a few minutes during a transatlantic phone call while he is away at a conference.

Dr. Sandra Scarr of Virginia University, president of the Society for Research in Child Development, believes geniuses are largely born. She says parents should not worry too much about whether to take their kids to a ball game or to a museum. Talent will out.

It seems psychologists are as divided as ever over the issue of nature versus nurture. This may, however, be about to change. A conference organised earlier this year by the Ciba Foundation brought to London some of the biggest names from both sides of the debate. Startling results from unpublished work were revealed - and the beginning of a consensus could be discerned.

The most exciting results came from those working on the biology of individual differences. Dr Robert Plomin of Penn State University, working with a team from Cardiff University, hopes to announce within the next few months that he has tracked down one of the genes that plays a part in determining intelligence. An unnamed gene has been identified but the results have yet to be confirmed.

At present, it is believed that genes account for at least half of what researchers call "g" - the general cognitive ability that IQ tests are supposed to measure -while environmental influences account for the other half. But so far the evidence for a genetic component has been purely statistical, being inferred from comparisons of twins and other such hereditary studies. Plomin's method makes use of new gene mapping techniques and promises to provide direct evidence of the role that genes play.

Plomin stresses that the discovery of a first gene does not mean the riddle of intelligence has been solved. A single gene will code for only one of the many neurotransmitters and cell proteins that are the building blocks of the brain. This means that hundreds, if not thousands of genes must be involved in intelligence. The identification of even one gene does, however, have immense implications for the nature/nurture debate.

Another innovation, the computerised brain scanner, has led to a second discovery by those seeking the biological component of mental abilities. Professor Camilla Benbow of Iowa State University is head of a long-term study of the mathematically gifted. For many years she has been puzzled as to why so many of the children in her study should be boys - at the top level, boys outnumber girls by 13 to one. In a soon-to-be-published paper, Benbow reveals that the gifted boys' brains appear to process spatial information in a very different way from those of average boys and even of gifted girls.

The children in the study were scanned while being presented with a simple visual puzzle. The boys of average ability and the gifted girls showed strong activity on both sides of their brains as they thought about the puzzle. However, the gifted boys responded very differently. There was a sudden drop in activity in their left hemispheres - the side of the brain most involved in language - and an exaggerated reaction on the right, the side strongest at spatial thinking. It seems that the brains of boys with mathematical talent operate in a way that is physically distinctive.

Benbow says she was surprised that the gifted girls should lack this pattern of response. The only explanation she has is that male brains have a tendency to become more lateralised during development; when this lateralisation is taken to an extreme, unusual spatial abilities result.

Because females do not have this tendency (lateralisation is known to be hormonally governed), girls who perform well in mathematics are doing so because of a more general mental superiority. And because statistically such all-round ability is less common, this would be the reason for there being fewer mathematically gifted girls.

Benbow is quick to add, however, that cultural expectations probably exaggerate the imbalance. In China, where girls are more likely to get encouragement in mathematics, the number of gifted boys exceeds that of gifted girls by four to one rather than the 13 to one seen in the United States.

Both Plomin's and Benbow's findings would seem to give ammunition to the argument that exceptional mental abilities are largely innate. But the Ciba conference heard equally strong evidence for the role that environmental factors play in creating genius. A theme repeatedly heard from the speakers was that special children invariably have special parents.

It is a popular myth that great prodigies - the Einsteins, Picassos and Mozarts of this world - spring up out of nowhere as if touched by a divine finger. The archetype is Carl Friedrich Gauss, born into a supposedly illiterate family of labourers, who grew up to become the father of modern mathematics.

Professor William Fowler of the Massachusetts Centre for Early Learning has attacked this myth, saying that when he looked into Gauss's childhood, he found that Gauss's mother had been teaching him numerals at the age of two. His father had been a foreman, not a labourer, and played calculation games with him. Furthermore, Gauss had an educated uncle who taught him sophisticated maths at an early age.

It is the same story with other prodigies. Einstein's father was an electrical engineer who fascinatedhis son with practical demonstrations of physics. Picasso's father was an art teacher who had young Pablo copying still lifes at the age of eight. Mozart's father was a court composer who was teaching his son to sing and play almost before he could walk. "In every case, when you look into the backgrounds of great people, there is this pattern of very early stimulation by a parent or mentor figure," Fowler says.

But what sort of parental stimulation should it be? The conference heard plenty of evidence that, too often, parental pressure and attempts at "hot-housing" children result in burn-out rather than giftedness. Professor Mihaly Csiko of the University

of Chicago reported on a study which identified two kinds of parental style - the supportive and the stimulating.

Supportive parents were those who would go out of their way to help their children follow their pet interests and praised whatever level of achievement resulted. Generally, such parents created a harmonious home governed by clear rules. Stimulating parents were more actively involved in what their children did, steering them towards certain fields and pushing them to work hard, often acting as a tutor.

Csiko's study followed four groups of children: one with supportive parents, one with stimulating parents, one whose parents combined both qualities and a final group who offered neither. The children were given electronic pagers; when these buzzed at random intervals during the day, they had to make a note of what they were doing and assess how happy and alert they felt.

The not too surprising result was that the children whose parents were simply supportive were happier than average but were not particularly intense in their concentration when studying or working on an interest. The children who fared best were those whose parents were both supportive and stimulating. These children showed a reasonable level of happiness and a very high level of alertness during periods of study.

Children whose parents were stimulating without being supportive were candidates for burn-out. These children did work long hours, but their alertness and happiness during study time was far below that of children in more balanced family environments.

Another crucial factor stressed at the Ciba conference is the need for parents to have proper conversations with their children. Through having the chance to talk with adults, children pick up not only language skills but also adult habits and styles of thought. One reason why prodigies such as Picasso and Einstein had a head start in life was that they had parents who demonstrated how to think about subjects like art or physics at a very early age.

Professor Fowler said a survey in Holland showed that a typical father spent just 11 seconds a day in conversation with his children. A more recent study in America produced a somewhat better result, but the fathers in question were still talking to their children for less than a minute a day.

It is not just the time spent that counts, Fowler says, but also the way in which a parent talks. A parent who brushes off a child's questions or gives dull answers will be imparting a negative, narrow-minded style of thinking. On the other hand, parents happy to take a child step by step through an argument, encouraging it to explore ideas, will foster an open and creative thinking style.

Fowler is attempting to show this experimentally with a study in which groups of parents are taught how to have constructive conversations with their toddlers. Fowler says these children have shot ahead of their peer group in language ability, intellectual ability and even social leadership skills. While the study is not yet complete, the children appear to have been given a lasting advantage.

So what is the outlook for parents who do everything right, those who manage to be both supportive and stimulating, who are good at demonstrating thinking skills to their children and successful at fostering a self-motivated approach to learning? Would such parents be guaranteed to have a gifted child?

There was general agreement at the conference that there is no denying that genuine biological differences exist between individuals; geniuses need to be lucky in both their genetic make-up and their parents. The most significant implication would seem to be that while most people are in a position to fulfil their biological potential -that is, barring serious illnesses or dietary deficiencies, they can be certain their genetic capacities will be fully developed - there can be no such certainty that they will grow up in the environment necessary for that development.

So although knowing more about the biology of genius is all very interesting, it is research into better parenting and educational techniques that will have lasting significance.

By John McCrone
The Independent on Sunday, 2/5/93
(slightly adapted)

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**Appendix 2**

**Reading exercise used in the study**

## THE ENGLISH CENTRE

Student's Name:_____

Number:_____

**Reading exercise: Is there a gene for genius?**

Introduction

The aims of this exercise are to help you explore the text, check your understanding, look at how some of the ideas are connected, and ask some critical questions.

Different students have different needs and reactions. Please be patient if you personally find some items very easy or too difficult. We will ask for your comments later.

Your teacher will tell you how much time you have. Don't spend too long on any one item! Write your answers on the exercise sheet.

Exercise*

1. **Vocabulary and ideas**

a. What is the "nature/nurture" question? (Hint: If you are not sure what "nurture" means, then make a guess based on the text; it is obviously something contrasted with "nature"!).

_____

_____

_____

b. Place the seven words or phrases in the list under one of the two columns. The first two have been placed for you.

LIST: 1. largely born 2. largely made 3. genetic component of intelligence

4. hereditary influences 5. environmental influences

6. innate abilities 7. cultural expectations.

| "NATURE" | "NURTURE" |
|---|---|
| 1 | 2 |

(* line numbers were provided for the students on their copy of the reading text for ease of reference)

**2. Work by Plomin and his team**

a. Note down words and phrases from the text that remind us that Plomin's results are not yet final.

_____

_____

b. What new kind of research technique has Plomin's team used?

_____

**3. Work by Benbow and her team**

a. What new research technique was used?

_____

b. Benbow was studying mathematically gifted children. What aspect of her study was unexpected? (Paragraph 7, lines 45-55)

_____

_____

c. Based on the work of Benbow and her team, answer the following questions about how gifted boys' brains work. (Hint: If the word "lateralisation" troubles you, remember that the adjective "lateral" has to do with "sides").

(i) What information do gifted boys' brains process differently from other people?

_____

(ii) What is special about their brain activity?

_____

(iii) Is this aspect of brain activity inborn or a result of environmental factors?

_____

(iv) Is this aspect of brain activity the only reason that fewer mathematically gifted girls than boys are found in the United States?

Answer YES or NO _____

- Briefly explain your answer :

_____

_____

_____

_____

4. **Critical reading: read lines 86-116**

   a. "It is a popular myth that..." (line 93). Does the writer go on to agree or disagree with the belief that he reports here? ANSWER:_____

   b. Was Gauss's family illiterate?
   - Answer YES or NO_____
   - What one word (in lines 93-98) explains your answer?_____

   c. Fowler's comments provide reasons to suppose that the environmental role of parents (or other figures) in early life is important. What is a common factor (other than just "having special parents") in the examples he discusses (Gauss, Einstein, Picasso and Mozart)?

   _____

   _____

5. What does the use of the term "hot-housing" (line 119) tell us about the writer's attitude towards attempts by parents to make children learn and develop more rapidly?

   _____

6. a. According to Csiko's findings, which parental style or combination of styles is most beneficial for children? Circle your chosen answer.

   SUPPORTIVE STIMULATING BOTH

   b. What aspects of parent-child conversation are important, according to Fowler? (lines 152-181).

   _____

   _____

7. Do you think the conclusion (see final paragraph) is that of the discussions at the scientific conference, or the journalist writing the article?

---

**Appendix 3**

**"Idea Units" targeted in the study**

1. X believe that geniuses are largely born (that heredity matters) (X = Scarr, some scientists, etc.)
2. Y believe that geniuses are largely made (Y = Gardner, etc.)
3. (1 and 2 can be paraphrased as) The issue is (Psychologists are divided over) nature versus nurture.
4. The issue (3) was discussed at a recent conference (in London; Ciba foundation).
5. The beginnings of a consensus (reduction of difference) could be discerned.
6. Plomin has (probably) discovered a gene that plays a part in determining intelligence.
7. Plomin's results have yet to be confirmed.
8. At present, scientists etc. believe genes account for at least half of "g" (general cognitive ability; and think environmental factors/influences account for the other half/part).
9. Evidence (re 8) has so far been statistical.
10. Plomin used new gene mapping techniques.
11. Plomin's work promises to provide direct evidence of the role that genes play.
12. Many genes must be involved in intelligence.
13. Discovery of even one gene (that contributes to intelligence) has immense implications for the nature/nurture debate.
14. Benbow (et al) used the computerised brain scanner.

15. Benbow was studying the math. gifted (wanted to explain why so many math. gifted children were boys).

16. Benbow's study showed that gifted boys process spatial information differently.

17. (Math.) gifted boys' brains operate in a way that is physically distinctive.

18. (Benbow's explanation is that) male brains tend to become more lateralised during development.

19. Lateralisation is hormonally governed.

20. Extreme lateralisation (B. explains) results in unusual spatial abilities.

21. Girls who perform well in math. do so because of general mental superiority.

22. Cultural expectations can exaggerate the imbalance (bet. numbers of gifted boys & girls: + example comparing ratio of gifted boys to gifted girls in China and in America).

23. Plomin's and Benbow's findings strengthen the argument that exceptional mental abilities are largely innate.

24. The conference heard (equally strong) evidence for the role of environmental factors.

25. (One theme was that) special children invariably have special parents.

26. A popular myth is that geniuses just happen (divine finger!)

27. (Fowler maintained that) backgrounds of all great people had pattern of early stimulation by parent or mentor figure.

28. Examples included (some or all of) Gauss, Einsfein, Picasso & Mozart.

29. (A relevant question is:) What sort of parental stimulation should it be?

30. Csiko identified (studied) two kinds of parental style - supportive & stimulating.

31. Supportive parents helped children follow pet interests (and praised whatever achievements resulted).

32. Stimulating parents pushed children towards preferred fields (and/or) pushed children to work hard.

33. Csiko's study compared (4) groups (of children) with different (combinations of) parental styles.

34. Children who fared best had parents who were both supportive and stimulating.

35. These (34) children were reasonably happy and very alert when studying.

36. Another crucial factor was the need for parents to have proper conversations with their children.

37. (Fowler said that not only amount of time but especially) the way in which a parent talks is important.

38. Parents who take a child step by step through an argument and encourage it to explore ideas will foster an open and creative thinking style (will encourage learning).

39. (When) parents (are taught to) have constructive conversations with their toddlers, these children do better (shoot ahead of peer group in language ability, leadership ability & social leadership skills).

40. There was general consensus that (no denying that) genuine biological differences exist.

41. Geniuses need to be lucky in both genetic make-up and parents (both genes and environmental factors are important).

42. Most people are in a position to fulfil their biological potential.

43. The most significant implication is that there is no certainty that the environment will provide necessary support as people develop.

44. Therefore (43) (it is) research into better parenting & educational techniques (that) will have (more) lasting significance.